

CLAIMS

WHAT IS CLAIMED:

1. A device, comprising:

5 a sensor adapted to provide a signal responsive to temperature; and

a refresh rate control unit operatively coupled with said sensor, said refresh rate control unit being adapted to adjust a refresh rate associated with at least a portion of said device in response to said temperature signal.

10 2. A device, as set forth in claim 1, wherein the refresh control unit is adapted to increase the refresh rate in response to detecting an increased temperature.

3. A device, as set forth in claim 1, wherein said refresh rate control unit further comprises:

15 a comparator coupled to receive the temperature responsive signal at a first input terminal and a reference signal at a second input terminal, said comparator being adapted to deliver a first signal in response to the temperature responsive signal being less than the reference signal and a second signal in response to the temperature responsive signal rising above the reference signal; and

20 an oscillator adapted to produce a refresh signal at a first preselected rate in response to receiving the first signal and at a second preselected rate in response to receiving the second signal.

4. A device, as set forth in claim 3, wherein the oscillator includes a counter and a logic circuit adapted to select a first bit of the counter to produce the refresh signal in response to receiving the first signal and select a second bit of the counter to produce the refresh signal in response to receiving the second signal.
5. A device, as set forth in claim 3, wherein the comparator is further adapted to deliver the first signal in response to the temperature responsive signal falling a preselected magnitude below the reference signal.
6. A device, as set forth in claim 3, wherein the comparator includes a hysteresis effect.
7. A device, as set forth in claim 3, further comprising a digital filter coupled electrically intermediate the comparator and the oscillator.
8. A device, as set forth in claim 7, wherein the digital filter passes the second signal to the oscillator after the second signal persists for a preselected period of time.
9. A device, as set forth in claim 1, wherein the sensor is thermally coupled with the device.
10. A device, as set forth in claim 8, wherein the sensor is at least partially formed within a common substrate with the device.

11. A device, as set forth in claim 1, wherein the refresh rate control unit is further adapted to provide a first signal in response to the temperature signal being within a first preselected range and a second signal in response to the temperature signal being within a second preselected range, said refresh rate control unit being further adapted to provide a refresh signal at a first preselected rate in response to receiving the first signal and at a second rate in response to receiving the second signal.

12. A device, comprising:
means for detecting a temperature of at least a portion of a memory device; and
means for adjusting a refresh rate associated with at least a portion of said memory device in response to the magnitude of the detected temperature.

13. A method, comprising:
detecting a temperature of at least a portion of a memory device; and
adjusting a refresh rate associated with at least a portion of said memory device in response to the magnitude of the detected temperature.

14. A method, as set forth in claim 13, wherein adjusting the refresh rate associated with at least a portion of said memory device in response to the magnitude of the detected temperature further comprises increasing the refresh rate associated with at least a portion of said memory device in response to the magnitude of the detected temperature increasing.

15. A method, as set forth in claim 13, wherein adjusting a refresh rate associated with at least a portion of said memory device in response to the magnitude of the detected temperature further comprises comparing the temperature responsive signal with a reference signal and delivering a refresh signal at a first preselected rate in response to the temperature responsive signal being less than the reference signal and at a second preselected rate in response to the temperature responsive signal rising above the reference signal.

16. A method, as set forth in claim 15, wherein delivering a refresh signal at a first preselected rate in response to the temperature responsive signal being less than the reference signal further comprises delivering the refresh signal at the first preselected rate in response to the temperature responsive signal falling a preselected magnitude below the reference signal.

17. A method, as set forth in claim 15, wherein comparing the temperature responsive signal with the reference signal and delivering the refresh signal at the first preselected rate in response to the temperature responsive signal being less than the reference signal and at a second preselected rate in response to the temperature responsive signal rising above the reference signal further comprises including a hysteresis effect to the comparing operation.

18. A method, as set forth in claim 15, further comprising applying digital filtering to the comparing operation.

19. A method, as set forth in claim 18, wherein applying digital filtering to the comparing operation further comprises comparing the temperature responsive signal with the reference signal a preselected number of times and delivering a refresh signal at a first preselected rate in response to the temperature responsive signal being less than the reference signal each of the preselected number of times.

20. A method, as set forth in claim 8, further comprising forming a sensor for detecting the temperature at least partially within a common substrate with the memory device.

21. A method, as set forth in claim 13, wherein adjusting the refresh rate associated with at least a portion of said memory device in response to the magnitude of the detected temperature further comprises providing a first signal in response to the temperature signal being within a first preselected range and a second signal in response to the temperature signal being within a second preselected range, and providing a refresh signal at a first preselected rate in response to receiving the first signal and at a second rate in response to receiving the second signal.

22. A system, comprising:
a processor;
memory; and

a memory controller operatively coupling the processor with the memory and being adapted to control refresh operations of the memory, the memory controller comprising:

a sensor adapted to provide a signal responsive to temperature of at least a portion of the memory; and

a refresh rate control unit operatively coupled with said sensor, said refresh rate control unit being adapted to adjust a refresh rate associated with at least a portion of said memory in response to said temperature signal.